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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------|------------------|
| 09/687,130 | 10/12/2000 | Robert Alan Cochran | 10992807-1 | 1247 |
| 7590 | 01/13/2005 | | EXAMINER | |
| HEWLETT-PACKARD COMPANY Intellectual Property Administration P.O. Box 272400 Fort Collins, CO 80527-2400 | | | TO, BAOQUOC N | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2162 | |

DATE MAILED: 01/13/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|------------------------|---------------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 09/687,130 | COCHRAN ET AL. | |
| | Examiner | Art Unit | |
| | Baoquoc N To | 2162 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on 07/01/2005.

2a) This action is FINAL. 2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) Claim(s) 1-13 and 15-31 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) Claim(s) _____ is/are allowed.

6) Claim(s) 1-13 and 15-31 is/are rejected.

7) Claim(s) _____ is/are objected to.

8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) All b) Some * c) None of:

1. Certified copies of the priority documents have been received.
2. Certified copies of the priority documents have been received in Application No. _____.
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

| | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date: _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date: _____ | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Claims 1-13 and 15-31 are pending this application. Claims 1, 3-4, 7, 9-122, 20, 22, 24-26, 28 and 30-31 are amended in the amendment filed on 07/01/04.
2. The examiner acknowledges both the claims 20-31 and the Sakuraba reference inadvertently left out in the rejected dated 06/25/2004. The claims are now being addressed and Sakuraba is cited in this Office action.

Response to Arguments

3. Applicant's arguments filed 07/01/2004 have been fully considered but they are not persuasive.

The applicant argues that "Sparks does not appear to be related to disk arrays or disk-array controller, does not once mention logical device units, and aside from providing a relatively primitive mirroring capability by redundantly storing data on the second storage device (4B in Figure 2) when data is directed to the first storage (4A in Figure 2), appears to be essentially unrelated to applicants claimed invention."

The examiner respectfully disagrees with the above argument because the claims limitation do not claimed any disk-array controller. The applicant's representative conducting the comparison between applicant's specification to Sparks' specification, which does not give any patentability weight. Second, the logical device units are not define in the claim, the claims are interpreted in light of the specification, limitation from the specification are not read into the claim, In re Van Guens 988 F.2d 1181, 26 USPQ2d 1057 (Fed.Cir 1993). It is reminded that Applicant cannot rely on the specification to impart to the claims limitations not recited therein. Such reliance is

ineffective to define over the prior art. In re Lundberg, 244 F2d 543, 113 USPQ 530 (CCPA 1957); In re Winklans, 188 USPQ 129 (CCPA 1975). Applicant are further reminded of the clear difference between reading the claim in light of the specification as allowed by 35 U.S.C. 112, 6th paragraph, and by In re Donaldson 29 USPQ2rd, 1845, 16 F.3d 1189 (Fed. Cir, 1994), and reading limitations of the specification into the claims In re Prater 415 F2d 1393, 162 USPQ 541 (CCPA 1969). Further, the Applicants always have the opportunity to amend the claims during prosecution and broad interpretation by the examiner reduces the possibility that the claim, once issued, will be interpreted more broadly than is justified, In re Prater, 162 USPQ 541, 550-51 (CCPA 1969).

Applicant argues “Beier does not discuss or mentions LUNs, timestamps associated with LUNs, timestamps associated with any physical device, or anything else related to Applicant’s claimed invention.”

The examiner respectfully disagrees with the above argument. These LUNs, timestamps associated with LUNs, timestamps associated with any physical device are not in the claims. The claims are interpreted in light of the specification, limitation from the specification are not read into the claim, In re Van Guens 988 F.2d 1181, 26 USPQ2d 1057 (Fed.Cir 1993). It is reminded that Applicant cannot rely on the specification to impart to the claims limitations not recited therein. Such reliance is ineffective to define over the prior art. In re Lundberg, 244 F2d 543, 113 USPQ 530 (CCPA 1957); In re Winklans, 188 USPQ 129 (CCPA 1975). Applicant are further reminded of the clear difference between reading the claim in light of the specification

as allowed by 35 U.S.C. 112, 6th paragraph, and by *In re Donaldson* 29 USPQ2rd, 1845, 16 F.3d 1189 (Fed. Cir, 1994), and reading limitations of the specification into the claims *In re Prater* 415 F2d 1393, 162 USPQ 541 (CCPA 1969). Further, the Applicants always have the opportunity to amend the claims during prosecution and broad interpretation by the examiner reduces the possibility that the claim, once issued, will be interpreted more broadly than is justified, *In re Prater*, 162 USPQ 541, 550-51 (CCPA 1969).

The applicant also argues "there is no teaching or suggestion for the combination of Sparks and Beier. Sparks neither mentions nor suggests database management systems, timestamps, or timestamp-based synchronization of multiples databases. Sparks does not mention a need for comparing the data stored on the two different storage devices in order to determines whether or not mirror data has been corrupt."

The examiner respectfully disagrees with the above argument. Sparks discloses the method of backing up information using mirror wherein the mirrors are stored in the 4A and 4B (col. 3, lines 35-52) and the primary and the mirror are synchronized (col. 4, lines 53-65). The main purpose for backing up is to restore when the event the primary copy is down. That's is the motivation for combining the teaching of Beier because Beier closes the system for backup up and restoring by comparing the timestamps (col. 8, lines 18-col. 9, lines 1-18). The since Sparks suggests for backup and Beier discloses backup and restored utilizing the comparison process of timestamp, both are in the same field of endeavor, Beier implementation would help to improve the backup and restore.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-12 and 20-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sparks et al. (US. Patent No. 5,212,784) in view of Beier et al. (US. Patent No. 6,065,018).

Regarding on claims 1 and 20, Sparks teaches method for backing up a computer-readable object stored on a first logical device unit, the method comprising:

when the object is not currently mirrored to a mass storage device, creating a mirror for the object on a second logical device unit (pair mirrored) (col. 3, lines 41-43);

when the object and the mirror for the object are split, resyncing the object with the mirror for the object (resynchronizes) (col. 6, lines 5-19);

splitting the object and the mirror for the object so that the mirror becomes a backup copy of the object and so that I/O requests directed to the object are not automatically directed to the mirror (col. 3, lines 46-52);

Sparks does not explicitly teach retrieving a first instance current timestamp from the second logical device unit and saving it as a saved timestamp; updating the current

timestamp upon executing any I/O operation directed to the second logical device unit that alters data stored on the second logical device; when the object is determined to need to be restored from the mirror, retrieving a instance of the current timestamp from the second logical device; comparing the retrieved second instance of the current timestamp to the saved timestamp; when the second of the current timestamp is equal to the saved timestamp, copying the mirror to the first logical device unit to replace or again create the object on the first logical device unit . However, Beier teaches "as part of maintaining the recovery resources, the storage manager 104 or the controller 202 keeps track of the timestamp of the last hierarchical and relational log entries. The hierarchical and relational log entries. The hierarchical time stamp is compared to the last relational log in task 612, then the updates are applied to the hierarchical databases... If the a new time stamp for the last entry to the relational database (relational time stamp) is received within a designated period of time in task 616, then the method 600 again compares the hierarchical database time stamp in task 617 (hierarchical time stamp) with the relational time stamp in task 612, and if the hierarchical is less than or equal to the relational time stamp, the updated log records are applied to the remote site 200 hierarchical database. By assuring that the hierarchical time stamp, the update logs for the hierarchical database and the relational database are able to be synchronized for latter processing" (col. 8, lines 64-67 to col. 9, lines 1-19). This teaches the updating the timestamp and the timestamp comparison process to restore the file. Therefore, it would have been obvious to one ordinary skill in the art at the time of the invention was made to modify updating the timestamp and

utilizing the time stamp comparison process of Beier into Sparks in order to restored the data in the most current state.

Regarding on claims 2 and 21, Sparks teaches including copying the object to a second backup copy on a difficult-to-modify mass storage device after splitting the object and the mirror for the object (col. 3, lines 30-34).

Regarding on claims 3 and 22, Beier teaches when the second instance of the current timestamp is not equal to the saved timestamp, copying the second backup copy from the difficult-to-modify mass storage device to the first logical device unit to replace (copy means replace) or again create the object on the first logical device unit (col. 7, lines 24-51).

Regarding on claims 4 and 23, Sparks teaches the second logical unit spans one or more hard disk drives and the difficult-to-modify mass storage device is a tape drive (col. 3, line 30-34).

Regarding on claims 5 and 26, Beier teaches the first and second logical units are provided by one or more disk array controllers, wherein data stored to the first and second logical units are stored by the one or more disk array controllers on one or more hard disk drives, and wherein the one or more disk array controllers provide timestamps to requesting applications and systems and update the timestamp associated with a logical device upon executing I/O operations directed to the logical device that alters data stored on the logical device (col. 8, lines 64-67 to col. 9, lines 1-18).

Regarding on claims 6 and 27, Beier teaches prior to retrieving a current timestamp from the second logical device and saving it as a saved timestamp, enabling

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time stamping on the second logical device unit (col. 5, lines 49-55), and wherein the timestamp is updated upon executing any I/O operation directed to the second logical device that alters data stored on the second logical device only when timestamping is enabled on the second logical device unit (col. 8, lines 64-67 to col. 9, lines 1-18).

5. Claims 7-12 and 26-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sparks et al. (US. Patent No. 5,212,784) in view of Beier et al. (US. Patent No. 6,065,018) and further in view of Sakuraba et al. (US. Patent No. 5,452,448).

Claims 7 and 26 are rejected under the same reason as claim 1, however, Sparks and Beier do not close the count. On the other, hand, Sakuraka discloses "the replica server 120 compares the update count field 722 and the validating data field 723 sent at step 755 with the update count made or generated in the replica server 120 and the validation data" (col. 9, lines 61-69). This teaches the step of incrementing the count field for each update. Therefore, it would have been obvious to one ordinary skill in the art at the time of the invention was made to modify Spark and Beier system to include incrementing the count field for each update as taught by Sakuraka in order restore the corrected version of files when the restore process is requested.

Regarding on claims 8 and 27, Sparks teaches including copying the object to a second backup copy on a difficult-to-modify mass storage device after splitting the object and the mirror for the object (col. 3, lines 33-54).

Regarding on claims 9 and 28, Sakuraba teaches the current count is not equal to the saved count, copying the second backup copy from the difficult-to-modify mass storage device to the first logical device to replace or again create the object on the first storage device (col. 9, lines 61-66).

Regarding on claims 10 and 29, Sparks teaches the mass storage device is one or more hard disk drives and the difficult-to-modify mass storage device is a tap drive (col. 3, line 30-33).

Regarding on claims 11 and 30, Sakuraba teaches the first and second logical (online database) unit are provided by one or more disk array controller, wherein data stored on the first and second logical units are stored by the on or more disk array controller on one or more hard disk drives, and wherein the one or more disk array controller provide counts to requesting application and systems and increment the count associated with a logical device upon executing I/O operations directed to the logical device that alters data stored on the logical device (col. 9, lines 61-66).

Regarding on claims 12 and 31, Sakuraba teaches prior to retrieving a current count from the second logical device and saving it as a saved count, enabling counting on the second logical device unit, and wherein the count is updated upon executing any I/O operation directed to the second logical device that alters data stored on the second logical device only when counting is enable on the second logical device unit (col. 9, lines 61-66).

6. Claims 13 and 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Carter et al. (US. Patent No. 5,909,540) in view of Beier et al. (US. Patent No. 6,56,018).

Regarding on claim 13, Carter teaches a mass storage device that provides logical device units to accessing computers, the mass storage device comprising:

A medium for storing data (storage devices e.g., hard disks) (col. 8, lines 20-21);

A data writing device and reading device for writing data to medium and reading data from the medium (to store and retrieve data to and from the one or more persistent storage memory devices) (col. 7, lines 10-14);

Memory (memory) (col. 7, lines 8-10) and logic processing components (logical volumes) (col. 10, lines 20-28); and

A controller that executes (data control program 32a) within a logic processing component and controls reading and writing of data to and from the memory and to and from the medium (the data control program 32a can stream data to, and collect the data from, the shared memory subsystem) (col. 7, lines 27-29), the controller providing, in addition to execution I/O operations, including execution of read and write operations to and from logical device units to a mirror object stored on a second logical device unit (the replication controller for generating a copy, or select number of copies...and storing the copy in the local persistence memory device of a second computer) (col. 18, lines 3-8) and a current state metric for each logical device unit that can be requested by an accessing computer , the controller updating the current state metric for a logical device unit whenever the controller executes an I/O operation that changes the data (stored file

metadata, such as the file time stamps and file size, can be updated quite frequently, making the metadata update more expensive) (col. 10, lines 46-49), stored on the medium for storing data copy in the local persistence memory device of a second computer) (col. 18, lines 3-8), included in the logical device unit's data (logical volumes) (col. 10, lines 22-25). Carter does not explicitly teach a current state metric for each logical device unit that can be request by an accessing computer. However, Beier teaches "as part of maintaining the recovery resources, the storage manager 104 or the controller 202 keeps track of the timestamp of the last hierarchical and relational log entries. The hierarchical and relational log entries. The hierarchical time stamp is compared to the last relational log in task 612, then the updates are applied to the hierarchical databases... If the a new time stamp for the last entry to the relational database (relational time stamp) is received within a designated period of time in task 616, then the method 600 again compares the hierarchical database time stamp in task 617 (hierarchical time stamp) with the relational time stamp in task 612, and if the hierarchical is less than or equal to the relational time stamp, the updated log records are applied to the remote site 200 hierarchical database. By assuring that the hierarchical time stamp, the update logs for the hierarchical database and the relational database are able to be synchronized for latter processing" (col. 8, lines 64-67 to col. 9, lines 1-19). This suggests the system access the log for checking whether the log containing the most recent time stamp. Therefore, it would have been obvious to one ordinary skill in the art at the time of the invention was made to modify updating the timestamp and utilizing the time stamp comparison process of Beier into Carter in order

to access the log files to retrieve the time stamp as the current state metric in order to restore the data in the most recent state.

Regarding on claim 15, Beier teaches I/O operations directed to a logical device unit that enables maintenance of a current state metric for the logical device unit and disables maintenance of a current state metric for the logical device unit, and wherein the controller updates the current state metric only when maintenance of a current state metric for the logical device unit is enabled (col. 8, lines 64-67).

Regarding on claim 16, Beier teaches the current state metric is a timestamp (time stamps) (col. 8, lines 37-50).

Regarding on claim 17, Beier teaches the controller updates the timestamp by saving a current time (col. 8, lines 64-67).

7. Claims 18-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Carter et al. (US. Patent No. 5,909,540) in view of Beier et al. (US. Patent No. 6,065,018) and futher in view of Mutalik et al. (US. Patent No. 6,161,111).

Regarding on claim 18, Carter and Beier teach the subject matter except for the current state metric is a counter. However, Mutalik teaches, "as the file map utilization module 143 receives the data from the mass storage sub-system 12, it will store the data in the buffer pointed to by the buffer provided in the file read command, for later transfer to the data stored 14, during a backup operation. After the file map utilization module 43 has received and buffered all of the data, it (that is, the file map utilization module) will increment the data read counter and decrement the remaining data counter by value corresponding to the amount of data that has been received and buffered (step

168) (col. 13, lines 54-67). This teaches state metric is a counter. Therefore, it would have been obvious to one ordinary skill in the art at the time of the invention was made to modify timestamps of Mutalik into Carter and Beier in order to provide the counter the indication to restoration of the backup files.

Regarding in claim 19, Carter and Beier do not explicitly teach the controller updates the counter by incrementing the counter. However, Mutalik teaches, "as the file map utilization module 143 receives the data from the mass storage sub-system 12, it will store the data in the buffer pointed to by the buffer provided in the file read command, for later transfer to the data stored 14, during a backup operation. After the file map utilization module 43 has received and buffered all of the data, it (that is, the file map utilization module) will increment the data read counter and decrement the remaining data counter by value corresponding to the amount of data that has been received and buffered (step 168) (col. 13, lines 54-67). This teaches the counter is incrementing each time the I/O operation to provide the restoration of files. Therefore, it would have been obvious to one ordinary skill in the art at the time of the invention was made to modify timestamps of Mutalik into Carter and Beier in order to provide the counter the indication to restoration of the backup files.

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Baoquoc N. To whose telephone number is at 571-272-4041 or via e-mail BaoquocN.To@uspto.gov. The examiner can normally be reached on Monday-Friday: 8:00 AM – 4:30 PM, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Breene can be reached at 571-272-4107.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks
Washington, D.C. 20231.

The fax numbers for the organization where this application or proceeding is assigned are as follow:

(703) 872-9306 [Official Communication]

Baoquoc N. To

January 8, 2004

Mohamed Ali
Primary Examiner
AU: 2167